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‘Project Spraoi’: A randomized control trial to improve nutrition and physical activity in school children

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ABSTRACT

Background: Recent evidence predicts that by 2030, Ireland will have the highest rate of obesity in Europe. Consequently, there are concerns that health problems associated with this condition will present in childhood. Studies have shown that interventions based on increasing physical activity (PA) levels, reducing sedentary lifestyles and improving nutritional habits all pose protective mechanisms against obesity and its related disorders in youth. Yet, to date, there are no interventions being delivered in Ireland that concurrently target PA, nutritional habits and sedentary time amongst school children.

Purpose: The purpose of this study is to implement and evaluate an intervention that targets PA, nutritional habits and sedentary time in primary school children.

Methods: ‘Project Spraoi’ is a school based health promotion intervention, based on ‘Project Energize,’ which has been in operation in New Zealand since 2004. Measures of PA, nutritional knowledge/behaviours and health parameters including body composition, blood pressure (BP) and fitness will be gathered before and after the programme completion (24 months). For comparative purposes, we will compare these scores to a separate group who will not participate in the intervention and to counterparts partaking in Project Energize, NZ.

Conclusions: There is strong evidence that quality multi-component school-based programmes can increase PA, improve weight status and promote healthier dietary habits. Due to the increasing obesity levels, the implementation of such a programme that is rigorously evaluated is warranted in Ireland.

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1. Background/Introduction

Researchers have predicted that by 2030, Ireland will have the highest rate of obesity in Europe [1]. As a result, health problems associated with this condition may present in childhood [2–5]. One in four children in Ireland are already overweight or obese [6] and if this trend continues, as a consequence of unhealthy nutritional habits and physical inactivity, we may see this generation of children having a shorter life expectancy than their parents [7]. A mere

25% (31% boys, 18% girls) of Irish children undertake physical activity (PA) every day and only 20% (19% boys, 22% girls) report consuming vegetables more than once a day [8]. Furthermore, compared to their international counterparts, Irish children have low levels of PA, high levels of sedentary behaviour [9] and have poor dietary habits [8]. Such behaviours are unlikely to change as these children mature, and, subsequently, will contribute to rising health care costs.

Studies have shown increased PA levels [10–17], a reduction in sedentary behaviours [16,18–20] and improved nutritional habits [10,21–23] all pose protective mechanisms against obesity and its related disorders. A large number of studies have also shown positive outcomes from interventions targeting these variables in youth [14,24–29]. Yet, to date, there are no interventions being delivered in Ireland that concurrently target PA, healthy eating and sedentary time amongst school children. In direct response to this need, a health promotion intervention titled ‘Project Spraoi,’ (pronounced ‘spree’) was developed. The term Spraoi is a Gaelic Irish word, directly translated as ‘fun’. This intervention, incorporating

Abbreviations: PA, physical activity; BP, blood pressure; BMI, body mass index; BF, body fat; CONSORT, consolidation standards of reporting trials; DEIS, delivering equality of opportunity in schools; MVPA, moderate to vigorous physical activity; RE-AIM, reach; effectiveness, adoption; implementation, maintenance; FM, fat mass; FFM, fat free mass; HBSC, health behaviour of school children.

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the Social Ecological Model of Health Behaviour [30], attempts to create environments which promote PA and healthy nutritional choices to provide the individual with the knowledge, skills and motivation to engage in health enhancing behaviours.

The primary aim of 'Project Spraoi' is to be the first study to implement and evaluate an intervention targeting increased PA, reduced sedentary time and improved nutritional habits among Irish primary school children. Secondary aims are to evaluate intervention effects on (i) physical markers of health (body mass (BMI), body fat (BF), cardiorespiratory fitness, blood pressure (BP) and (ii) nutritional knowledge and habits (questionnaires) among Irish primary school children. This current article describes the methods of the project, which adheres to the Consolidation Standards of Reporting Trials (CONSORT) guidelines [31,32].

2. Methods

2.1. Study population

The Irish Department of Education and Skills website [33] listed 349 primary schools in Cork City and County in the 2011/12 academic school year. The Principal in each of these schools was sent a preliminary questionnaire in May 2013 examining (i) current policies and practices relating to PA and nutrition in their schools, (ii) barriers and facilitators relating to the promotion of increased PA and improved nutritional habits in their school, and, (iii) their schools interest in implementing the 'Project Spraoi' intervention. Each of the 151 schools who returned the questionnaire expressed an interest in implementing 'Project Spraoi'. For the purposes of this evaluation, however, certain inclusion criteria were set. These included (i) medium size (100–300 pupils) [34], (ii) have proximity (20 km) to the research Institute, (iii) willingness to implement the 'Project Spraoi' intervention, and, (iv) not currently participating in another PA and/or healthy eating intervention in their school. Future plans are to offer the intervention to all interested schools in the region; subject to positive findings from the evaluation and the securing of external funding.

In Year 1 of the research (academic year 2013/14), a sample of schools meeting this criteria ($n = 6$) with similar demographic characteristics relating to location (urban, rural), school type (single sex, mixed), socioeconomic status (DEIS (schools in lower SES areas), non-DEIS) were matched and randomly assigned as intervention or control. Participants in control schools did not receive any of the intervention components. They did, however, undertake all physical measurements, have their PA, sedentary and fitness levels monitored and completed the questionnaire/s at the same time points as the intervention participants.

Due to practical, logistical and financial constraints, the research team are implementing a stepped wedge intervention design [35] and rolling out the intervention sequentially to trial participants. In Year 1 of the research, 4 intervention schools and 2 control schools participated. In Year 2 (academic year 2014/15), 3 additional intervention schools and one extra control school were recruited (see Fig. 1). The research team envisage that intervention schools will maintain involvement with 'Project Spraoi' and new schools will be offered the intervention annually. Yet, this arrangement is dependent on school interest and procurement of research funding. Where possible, schools acting as control schools for a period of 2 years will be invited to become an intervention school.

This paper proposes that in Year 3 of the research (2015–2016), the project will grow to include a representative sample of Cork schools, which will be stratified by school location, gender and socio-economic status and will be drawn from schools who have expressed a willingness to implement the 'Project Spraoi'

intervention. The sample size necessary to detect changes in minutes in moderate to vigorous physical activity (MVPA) is based on previous studies [36–38]. Sample sizes are calculated to detect a mean difference of 10 min per day of school day MVPA, between intervention and control groups at the end of the intervention period. A standard deviation of 12 min is used [38,39]. Using $G \times \text{Power}$ 3.1.9.2 software, an ANCOVA with 5% level of significance and power of 80%, yielded a sample size of 48 participants (24 per group) per cohort (Senior Infants (5–7 year olds) and Fourth Class (9–11 year olds)), per school. To allow for possible drop outs, at least 54 participants (27 per group) will be recruited, per school. In year 1 of the study, 6 schools will be included in the study.

Prior to the commencement of the intervention, one of the lead researchers visited each principal and/or lead teacher at a participating school and the full outline of the study explained; along with the distribution of information sheets and consent forms. The consent form required all participating Senior Infant and Fourth Class children in each school and their parent/s/guardian/s to consent to having each of the physical measurements taken and to wear an accelerometer at baseline and follow-up. The research team chose these two age groups to be tested as part of the evaluation, based on children of these age ranges being at the advent of important ages for forming and understanding health habits. Cork Institute of Technology's Research Ethics Committee granted approval of the study (September 2013).

2.2. Development of intervention and evaluation framework

'Project Spraoi' is based on a New Zealand (NZ) health promotion intervention 'Project Energize' (www.projectenergize.org.nz), which was first implemented in 2004 and is currently delivered to all 244 primary and intermediate schools in the Waikato District Health Board region of NZ. 'Project Energize' has reported positive impacts on prevalence figures for overweight and obesity, physical fitness and nutritional behaviour among NZ children [40, 41].

Project Spraoi differs to Project Energize in four main ways. Firstly, Project Spraoi is based in the northern hemisphere, where although similarities in temperate climate with New Zealand are noted, there are distinct cultural, economic and educational differences between the two countries. Necessary adjustments have therefore been made to the planning, delivery and evaluation of the intervention in Ireland, which need to be assessed for effectiveness.

Secondly, the Project Spraoi intervention is primarily a research-led programme, receiving internal funding from the host institution, Cork Institute of Technology. As a result, the Energizers are all postgraduate researchers, who deliver both the intervention in their school/s and act as the primary data gatherers for the evaluation. This is not the case in New Zealand. Project Energize is an externally funded health promotion intervention, delivered by a team of employed Energizers who work for District Health Boards. Although it continues to inform the planning and delivery of the programme, the research arm of their intervention has always existed as a separate entity.

Due to financial and methodological constraints, it has not been possible to ensure that each Project Spraoi Energizer refrain from being involved in the evaluation data collection process for their school/s, which could lead to bias. Yet, steps have been put in place to ensure that each Energizer has minimal interaction with their intervention school at the time of evaluation. They are also only instructed to gather data of an anthropometric nature from their intervention school/s at the time of data collection. All evaluation tools that could require one to one interaction e.g. questionnaires and teacher/principal/child feedback, are administered by a researcher who has no connection with the school being analysed.

Thirdly, although Project Spraoi has the same overarching aims

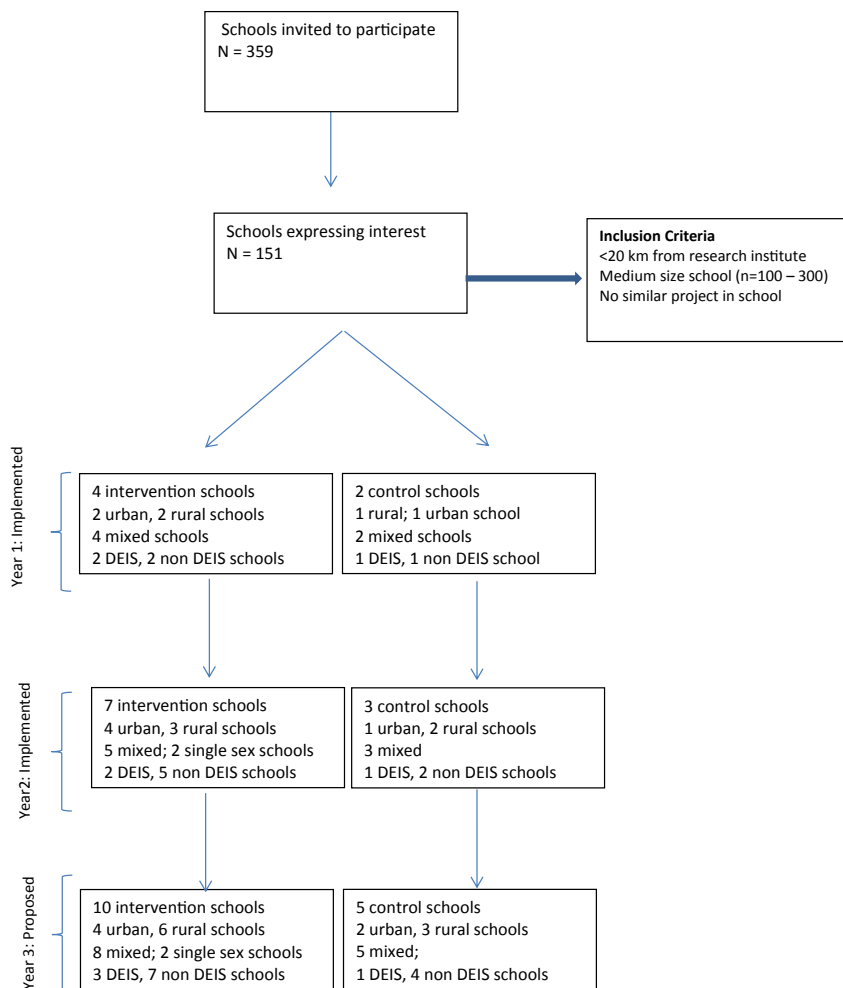


Fig. 1. Sampling framework 'Project Spraoi' year 1 & 2.

to that of Project Energize, and uses similar intervention and evaluation material, the Spraoi intervention and evaluation are research driven, in that each postgraduate project focuses on a specific outcome in more detail to that of the original Energize programme/evaluation. These include, but are not limited to, 1) nutritional intake (analysis of food diaries) 2) physical activity levels (accelerometry) 3) Fundamental Movement Skills (movement proficiency) and 4) Qualitative interviews (to gain more in depth insight from all participating individuals involved in programme delivery). Such data will allow for more in-depth analysis of the effectiveness of the Irish intervention to take place.

Finally, in order to evaluate the public health effects of 'Project Spraoi,' the RE-AIM (Reach, Efficacy, Adoption, Implementation, Maintenance) theoretical framework of programme evaluation is being adopted (42). This approach is used to assess the public health impact of an intervention; with its main goal to bring attention to the essential elements of a particular programme. It is envisaged that this then helps to encourage others to focus more on the essential elements of a specific intervention, so as to improve the effectiveness of its implementation in the future.

The RE-AIM framework comprises five main themes (i) Reach: the proportion of eligible people in the target population who participate in an intervention and the extent to which those participants represent the target population (ii) Efficacy: the extent to

which the intervention has a positive effect on relevant outcomes (iii) Adoption: an organizational measure of the number of programme providers who implement a programme and the extent to which they represent all possible programme providers (iv) Implementation: an organizational measure of the quality of the intervention's delivery and its adherence to the essential elements of the research programme and (v) Maintenance: a measure of the intervention's effectiveness at achieving the desired outcome for an extended time [43,44].

2.3. Intervention

2.3.1. Energizers

At study commencement (October 2013), the research team assigned each intervention school with a designated Energizer. The 'Energizer' aimed to provide support and assistance for school personnel to effectively implement 'Project Spraoi'. The Energizers were recruited via 'Project Energize's recruitment protocol, which required them to be teachers/graduates in the fields of exercise, nutrition and/or P.E. Prior to the commencement of the study, experienced Energizers from 'Project Energize,' NZ visited Ireland to provide training to the Irish Energizers on the intervention philosophy, structure and content. The Irish Energizers meet formally each month in order to share experiences, resources and

ideas. External support remains ongoing via teleconference at regular intervals (3 monthly) with the NZ Energize team.

The Energizer carried out a 'school stocktake' with a school leader, which involved a structured interview around current school policy, practices and resources relating to PA and nutritional habits. The Energizer also undertook a needs analysis session with school staff, which identified priority areas of improvement relating to PA and nutritional habits for each school. This bottom up approach resulted in the development of an action plan which was unique to each school. Central tenets of the programme include the promotion of 20 min 'huff and puff' (MVPA) each day, improvement of nutritional habits and knowledge through targeted class based activities, promotion of increased habitual PA and reduced sedentary time. Goals were then set and reviewed every six weeks by the Energizer and the lead teaching staff. If certain goals were not met, they were adjusted accordingly. Consideration was given to making the intervention synergistic with other school priorities, goals and processes [40].

Each school's programme is flexible and unique in its design, with the aim of the intervention being tailored to meet the needs of each individual school, throughout the delivery process. The content of the intervention is continuously evaluated and developed; based on reflections and feedback from participating schools.

The Energizer's aimed to help each school achieve their specific goals through a variety of means; including leading and assisting in the delivery of PA and healthy eating sessions, providing schools with resources, in-service training and support on how to promote PA, healthy eating and reduce sedentary time. Depending on the needs of the school, Energizers also helped to promote existing national healthy living campaigns e.g. bike week. The amount of time Energizers visit their allocated school varied depending on the school's needs but a maximum of 1.5 days a week was recommended.

Energizers provided assistance to parents/communities through parent-teacher activities and educational evenings with a qualified, registered nutritionist. As 'Project Spraoi' was designed as a school based intervention, the school were the main focus for delivery and the community and parents were targeted through the school. It was intended that the same messages that 'Project Spraoi' promoted in the school would reach into the home environment. Methods for getting messages home included: the 'Home Play PA Challenge'; nuggets – healthy tips published in the school newsletter; tip sheets – colourful messages going home as a fridge magnet and the 'Home School Link' – healthy eating education sessions delivered in class time for children and evenings for parents. Examples of these resources are available from the author on request.

2.4. Intervention evaluation protocol

2.4.1. Anthropometric measurements

Table 1 provides a summary of each of the physical measurements that took place at baseline (Oct 2013), and follow up (June 2015). If schools maintain involvement in 'Project Spraoi,' these measurements will be carried out bi-annually (start and end of each academic year). Measurements were undertaken by a team of 5 researchers (who were also the Energizers), who received training on data collection procedures over 3 separate workshops, from experienced researchers. Retraining was provided by a lead researcher, prior to each new evaluation stage in order to re-familiarise the research team with the evaluation protocol. To minimise intra reliability error, where possible, the same researcher carried out the same physical measurement with each

child pre and post intervention. All anthropometric measurements were undertaken by the researchers in a private setting, in small groups (6 children), for a total of 30 min. Each measurement was recorded twice by a researcher; with a third measure made when the pre-defined criterion was exceeded. If any unusual measures were consistently recorded, the researcher informed the class teacher and contact with a qualified health professional recommended.

Percentage BF was calculated from bio impedance data using equations developed with New Zealand children of similar age and ethnic groupings [44]. FM and FFM were derived from weight and % BF scores. Age and gender specific % BF for 'overweight' and 'obesity' cut offs were determined using the 85th and 95th centiles, based on UK body fat references curves for children [45]. Body mass index was calculated as kg/m². International Obesity Taskforce (IOTF) [46] age and gender specific criteria were used to classify BMI. Blood pressure scores were calculated using Jackson BP centiles [42] and raised BP and hypertension were classified using British >90th centile and 95th centiles, respectively [47]. Apart from the IOTF cut-offs used for BMI, British reference values were used for all other measures, due to (i) no Irish reference values, (ii) the proximity of the country with Ireland, and (iii) this approach having previously been used in 'Project Energize', NZ.

2.4.2. Cardiorespiratory fitness

The research team used time taken to complete a 550 m run/walk test as an indirect measure of cardiorespiratory fitness [49]. A rope measuring 110 m was placed on a flat grass surface and groups of up to five children were asked to run around the circumference of 110 m, five times, as fast as they could. Members of the research team recorded the running time for a maximum of three children, using a stopwatch. Recording of the five laps began after the researcher had explained the test and allowed for a one lap walk warm up. The test ended for each child once five laps were complete, or if a participant stopped running upon feeling that he/she could not continue the test. For those who did not complete the test, a note of 'non-completion' was recorded.

2.4.3. PA and sedentariness

The researchers measured PA and sedentary behaviour using Actigraph triaxial accelerometers (MTI model 7164, Fort Walton Beach, FL), which have been found to be a valid measure of PA amongst children [50]. The accelerometer was positioned to sit on the iliac crest of the right hip. Children were asked to wear the accelerometer during waking hours, for a period of 7 days, except while swimming and bathing. In an attempt to promote wear time adherence amongst those who consented, a group text message was sent to the parents/guardians of participating children each morning during data collection to remind the children to wear their accelerometer [51]. To be included in the analysis, participants were required to wear the accelerometer for a minimum of 600 min, on four separate days [52]. Time spent in PA of different intensities was based on the application of count thresholds. Minutes of physical activity of different intensities are calculated using cut points developed by Evenson et al. [53], with children of similar ages. Due to the sporadic nature of activity among children, data was collected at 5 s epochs to avoid underestimation of time in MVPA that may occur when longer epochs are used [54]. Accelerometer data is being analysed using Actilife software and adherence to recommended PA guidelines will be based on the proportion of children achieving 60 min of MVPA per day.

Table 1
Summary of physical measures.

Measure	Number of measures	Differences needed for a third measure	Device	Method
Height	2	>0.5 cm	Leicester portable height scale	Measured to nearest 0.1 cm, without shoes.
Body Mass	2	>0.5 kg	Tanita WB100MZ portable electronic scale	Measured to nearest 0.1 kg, with heavy outer clothing removed.
Waist Circumference	2	>0.5 cm	Non-stretch Seca 200 measuring tape	Measured as the circumference of the abdomen at its narrowest point between the lower costal (10th rib) border and the top of the iliac crest, perpendicular to the long axis of the trunk
Bioimpedance	2	>0.5 Ω	BIA, single frequency 50 Hz Bioimpedance Analyser, DF50	Measured with child lying supine on a plinth, with hands by their sides. The right shoe and sock were removed and 2 sites on their hand and foot were cleaned with an alcohol swab. Direct measurements were taken by the analyser once the electrodes and pads were placed on the child.
Blood Pressure: Systolic and Diastolic	2	>10 mmHg	Omron M2 Basic Auto Blood Pressure Monitor	BP was measured to ± 5.0 Ω and ± 10 mmHg on the right arm in a seated position, with the cuff positioned 2 cm above the elbow. Each child was asked to be seated for at least 5 min before any measurement was taken and 1 min was left between each of the BP measurements.

2.4.4. Questionnaires

2.4.4.1. Child questionnaire. During the evaluation, the researchers asked all participating children to complete ‘Project Energizes’ ‘Nutritional Knowledge/Attitudes Questionnaire,’ which was adapted from the ‘National Survey of Children and Young People’s Physical Activity and Dietary Behaviours in New Zealand: 2008/2009 Survey’ [55]. The questionnaire was administered 1:1 and was completed at the same time as the physical measurements. Participants were asked to rate on a 5 point Likert-type scale whether foods (milk, fizzy, water, fruit and vegetables, snacks and fast foods) were healthy or unhealthy.

2.4.4.2. Parent questionnaire. The ‘Food and Drink Survey’ was sent home on the same day that the physical measurements were recorded, to be completed by parents/guardians at both baseline and at follow-up. This questionnaire was used to gather data on participating school children’s eating practices. The questionnaire was previously used by the Energize evaluation team [40] and asked 13 questions relating to the consumption of breakfast and lunch at school, everyday foods (fruit, vegetables, water and milk) and occasional foods (snacks, takeaways, fizzy and fruit drinks) over the last seven days e.g. “In the past 7 days, how many times did your child eat snacks like crisps, cake, biscuits, chocolate and lolly pops?” “In the past 7 days, how many times did your child have a fizzy or soft drink such as cola or lemonade?” Following NZ protocol [40], all efforts were made to ensure attractiveness, ease of completion and return of the questionnaires.

2.5. Data processing and analysis plan

All data is stored and analysed using IBM SPSS (Statistical Package for Social Studies), Version 22 and is tested for statistical assumptions. Unexpected values/outliers will be highlighted and missing data will be accounted for by creating missing data categories. Binary, categorical and ordinal parameters will be summarised by means of absolute and percentage numbers within each group and sub-group (including ‘missing data’ as a valid category). Numerical data will be summarised by means of standard statistics (i.e., number of available data, number of missing data, mean, standard deviation, minimum, median, maximum, lower and upper quartile). In addition, adequate figures (e.g., bar charts, Box-Whisker-Plots) may be presented to summarise the results graphically.

The research team will perform all statistical tests at a two-sided 5% significance level. Two-sided confidence intervals will be

displayed for important variables. Appropriate methods will be used to derive confidence intervals, depending on data nature and distribution. Analysis of Covariance (ANCOVA) will be undertaken to determine whether or not a statistically significant difference exists between the experimental and control group, with the baseline measurements treated as covariates. Direct comparisons will be made with the NZ dataset of BMI, waist circumference, BP, BF%, aerobic fitness and each of the questionnaire responses. More general comparisons of PA and dietary behaviour will be made with the national Health Behaviour of School Children (HBSC) and “Growing Up in Ireland” studies, currently taking place here in Ireland.

3. Results

Preliminary data analysis of baseline measures is currently underway and will be available shortly. ‘Initial follow up data collection was completed in June 2015’.

4. Discussion

There is strong evidence that multi-component school-based obesity prevention programmes increase PA [56–58], improve weight status [59–61] and promote healthier dietary habits [62–65]. Yet, to date, Ireland has not introduced a fully evaluated intervention that incorporates each of these components; despite rising obesity levels. This study aims to address this issue by evaluating the effectiveness of a school-based health promotion initiative which targets increased PA, improved nutritional habits and reduced sedentary time, which may result in healthier body mass, amongst Irish primary school children. Measures of PA, nutritional knowledge/behaviours and long-term health parameters including body composition, blood pressure (BP) and fitness are gathered before and after the programme completion. For comparative purposes, these scores are compared to a separate control group that do not participate in the intervention and to counterparts partaking in ‘Project Energize’, NZ.

Findings from a systematic review of 32 studies, with over 52,000 participants [65] reported that recent school-based interventions demonstrated more convincing evidence of their effectiveness in reducing BMI scores because they tended to be longer, more comprehensive and included parental support. The greatest effects were seen in the interventions with a duration of greater than one year and included a wide range of multiple-level efforts including: providing information on PA and nutrition,

changing attitudes, monitoring behaviour, modifying environment, involving parents, increasing PA and improving diet; elements which are central to the 'Project Spraoi' intervention.

4.1. Strengths, limitations and findings from year one of the study

During year one of the project (academic year 2013/14), the research team found some notable logistical issues arising, surrounding the collection of data. In order to collect the broad range of measurements in both an accurate and timely manner, a minimum of five trained researchers were required; instead of the planned four. For the evaluation of year two (academic year 2014/15) of the project, therefore, the recommendation for a minimum of five researchers was proposed and adhered to.

Accelerometers are superior to other objective measures of PA [66], as they can quantify both the intensity and frequency of PA. Yet, their cost and the time required for data collection (7 days) is prohibitive for their practicality in large scale studies in the school-setting. Consequently, the 7-day PA data collection that took place during the year one evaluation took longer than anticipated. In year two, additional accelerometers were purchased which allowed data to be collected more efficiently.

During year one of the data collection it was noted that younger children had some comprehension difficulties with the 'Nutritional Knowledge/Attitudes Questionnaire'. A more practical, validated questionnaire was selected [67] and is being adopted for future evaluation of the project. The 'Fit Kids R Healthy Kids' questionnaire [67] was chosen for its reliability and validity amongst school children of a similar age range to 'Project Spraoi' (aged 6 years+) and was piloted in a local primary school to ensure it was appropriate and relevant for an Irish setting. The 15-item questionnaire asked questions relating to children's knowledge of healthy eating and only minor changes were necessary to make the questionnaire culturally relevant, such as including an image of the Irish Food Pyramid.

Although a brief process evaluation was undertaken with participating teachers and children during year one delivery of the intervention, the research team felt that more insight was required in order to adhere to the 'maintenance' theme of the RE-AIM Framework [42]. Consequently, a detailed process evaluation of the intervention commenced in October 2014 in one participating school (N = 287) and will continue until study end to help improve the effectiveness and further development of 'Project Spraoi'. A similar approach to that used in the WAVES study [68] has been adopted and the dimensions to be included are being guided by the Linnan and Steckler [69] and Dane and Schneider [70] frameworks. In order to triangulate findings, specific process evaluation questions have been developed and mapped on to the different evaluation dimensions and multiple methods for sourcing data are being used to measure the same evaluation dimension. A pragmatic approach to data collection tools has also been adopted to maximise response; while minimising the impact on intervention delivery and the workload for school staff.

Due to the restrictions (location of school, size of school) mentioned previously, the research team were unable to get a fully representative sample of school children from Cork; preventing the generalisability of the findings. Yet, by using the 'step wedge design' approach [35], the project aims to address this limitation, by gradually expanding the intervention to other schools across the region, until all interested schools are receiving the programme.

Traditional Randomized Control Trials study the effectiveness of interventions delivered to carefully selected populations under ideal conditions, which makes it difficult to translate results to the real world [71]. By adopting the RE-AIM Framework [42] and the 'step wedge design approach' [35], 'Project Spraoi' is adopting a

real-world approach to the delivery of the programme. Attention is being paid to intervention features that can be adopted and delivered broadly, have the ability for sustained implementation at a manageable cost, have the potential to reach large numbers of people, is replicable and can deliver long-lasting effects [42].

5. Conclusion

'Project Spraoi' is unique in that its design and implementation is based on the evaluated 'Project Energize' programme, which continues to run in three regions of NZ, with a total of 48,000 schoolchildren participating. An evaluation of the on-going NZ programme [40] that included over 5110 children from 192 participating schools, showed it to be cost effective in delivering measureable improvements in the health of children. 'Project Energize' children scored better on the 550 m run than their counterparts, were more physically active, had smaller waist circumferences, less overweight/obesity, had a reduced rate of rise in systolic BP and were better informed about practicing healthy eating habits than before the intervention began [40]. Similar positive findings are anticipated in 'Project Spraoi', which would support the rollout of the intervention to a wider audience; potentially improving health parameters in a large number of Irish schoolchildren.

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